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HEW Plans to Boost Preventive Biomedical Research

In the same fashion that "energy" and "environment" have become important passwords for acquiring support in the physical sciences, "prevention," in contrast to "treatment," is about to become an "open-sesame" of biomedical research.

The coming emphasis on prevention is heavily written into an internal document, "The Forward Plan for Health," which the Department of Health, Education, and Welfare (HEW) has prepared as a masterplan for the federal role in health services and research for the five-year period beginning next July 1. The plan, of which SGR has obtained a copy, must still be approved by the Office of Management and Budget and the Congress, but like cheap

commitment to research, evaluation, and the generation of new knowledge."

Adding that "it is very difficult to define the boundaries of the prevention theme," the plan says that "It has often been asserted. . . that changes in the socio-economic and cultural environment, affecting everything from diet and housing to life style, have a far greater impact on health status than all the preventive and acute health-care services provided. Certainly, one facet of our emphasis on prevention will include growing attention by the Assistant

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Support for Behavioral Science

Increased support for the behavioral sciences is strongly recommended in HEW's five-year plan for the federal role in health-related activities. The plan states that:

A major element in the preventive "strategy is to focus on developing better research and evaluation methodologies needed to determine the effectiveness of our various preventive activities. Particularly necessary are some improved methods of evaluating health-education activities, e.g., the anti-smoking campaign, the responsible-drinking campaign, etc. One crucial component to this research approach will be the support of the behavioral sciences as they focus on understanding motivation and attitudinal and behavioral change."

energy and pure environment, disease prevention is a saintly and sensible goal, and it is difficult to see who is going to rise against it. The issue, of course, will come to a crunch on the question of where, in the present mood of budget cutting, the funds are to come from. Some part is allocated to proposed budget increases for HEW's assorted health-related agencies, but written between the lines is also the suggestion that funds may be redirected from the present emphasis on research aimed at treating disease.

Thus, after designating prevention as a "major component of this nation's health strategy," and emphasizing its importance for alleviating suffering and reducing the cost of health care, the plan states that "a fundamental component of our emphasis on prevention is a full

In Brief

Nixon's proposal to provide nuclear reactors for Egypt and Israel is encountering serious opposition in Congress, which is in the process of equipping itself with authority to pass on international nuclear transactions. Latest to speak out against the plan—at least the Egyptian portion of it—is Senator Henry Jackson (D-Wash.), who told a Jewish women's organization that Egypt ought not to be trusted with nuclear materials.

While many of the leaders of science lament the abolition of the White House Office of Science and Technology, NSF Director H. Guyford Stever, who also serves as the President's Science Advisor, wryly points out, "Being outside of the White House was the best place for science during the past two years."

The top brass at the National Cancer Institute, backed up by the National Cancer Advisory Board, has turned down a proposal by Nobel laureate Linus C. Pauling for allocating a small portion of NCI research funds for the support of "unconventional projects." In a letter to Pauling, NCI Director Frank J. Rauscher Jr. took the position that "In the sense that every grant and contract awarded by the Institute is based on an individual idea, we are pursuing such a policy now."

The American Chemical Society has awarded the first loan, \$10,000, under its new plan to provide legal assistance for chemists who accuse their employers of job discrimination. The recipient, Sharon Johnson, assistant professor at the University of Pittsburgh, has charged sex discrimination in the University's attempt to fire her shortly before she was eligible to receive tenure.

AEC Yields on Opening Safeguards Unit Proceedings

Environmentalist organizations and nuclear critics have long been trying to force the Atomic Energy Commission to make all the meetings of the Advisory Committee on Reactor Safeguards (ACRS) open to the public.

Last month, they won a concession from the AEC, which announced that it will make public virtually all the minutes and internal documents of the ACRS which have accumulated since it was founded in 1957. The documents will be available for inspection at the AEC's public documents room in Washington, D.C., but they will contain deletions "primarily of the names and titles of persons engaged in the deliberations, names and titles of certain individuals discussed, and classified and

proprietary information."

Both the AEC and the ACRS are, however, standing firm on their decision to allow the committee to hold some of its meetings behind closed doors. A letter sent to AEC Chairman Dixy Lee Ray by William R. Stratton, chairman of the ACRS, states that "the committee continues to believe strongly that free and uninhibited interchange of views and expressions of opinions during its executive sessions are essential to the process of arriving at a consensus judgment. For this reason, the committee believes that such deliberative sessions must continue to be closed and that minutes released to the public should not reveal the names of the persons associated with a particular opinion or comment."

PREVENTION *(Continued from page 1)*

Secretary for Health to those 'controllable' environmental factors which appear to have such properties."

"The problems in the health care industry, in addition to inadequate knowledge, which tend to retard the progress of prevention, include a set of attitudes which are primarily oriented toward the treatment of acute and chronic illness, the directing of the vast majority of the industry's resources toward acute and chronic care, and the consequent difficulty of effecting change. . .

"The major elements of our preventive strategy," it continues, "are to assure the concentration of all federally supported health programs on preventive health services, health maintenance, and health education."

As far as basic research is concerned, the plan pays court to that anxiety-ridden profession with the assertion that "The first priority is for a greater support of basic research." But more to the point, it also states:

"While there is no serious challenge to the assertion that a major federal role in the health industry is the support of basic biomedical and behavioral research, there are growing concerns as to the size and direction of that investment. For example, there are current questions about how priorities are set for biomedical research programs, why the cost of doing research is climbing so rapidly, what the appropriate relation should be between research and health service needs, what the effect of increasing pressure for targeted programs is, and whether there is sufficient 'balance' between and around the various investment targets in the research portfolio."

These and related questions, the plan notes, are to be examined by a presidentially appointed National Commission on Biomedical Research. But, in the meantime, HEW, the plan reveals, is going to undertake its own examination of two major biomedical legacies of the Nixon Administration, the expanded cancer and heart disease research programs, plus that longstanding swamp of controversy, the National Institute of Mental Health. "We

propose to undertake a review of these efforts," the plan says somewhat cryptically, "in order to determine their value for planning, priority setting, and policymaking at all levels."

Just what this may mean in terms of budgeting remains to be revealed, but great disillusionment has already set in as far as the Manhattan Project approach to disease is concerned, and an ironic outcome of the new emphasis on prevention may be something of a boost for some fundamental research outside of fields that have been faddishly linked to politically popular diseases. The plan notes, for example, that "Progress in many of our national health objectives in disease control and prevention efforts is hampered by gaps in our understanding of the fundamental normal and pathological processes at work. Important among these cross-cutting areas of research are immunology, cell membrane research, and the cellular and molecular basis of growth, aging, and disease."

As far as specifics are concerned, the prevention theme calls for strengthening the States' capacities in laboratory diagnostic technology, including support for amniocentesis services. Sure to be controversial is a call for support for a national program of fluoridation of "all community sources of drinking water." And the plan also proposes new research on occupational carcinogenesis, and a strengthening of local-community programs for "environmental health problems beyond rodent control and lead-based paint poisoning."

For financing these and other programs, the budget for the fiscal year that starts next July 1 is set at \$5.9 billion, an increase of \$1.1 billion over present health expenditures by HEW. Within these totals, the increase for the National Institutes of Health is relatively modest, amounting to \$165 million, which, considering the standstill levels that have prevailed at NIH—with the exception of the Cancer Institute—in recent years, will not buy a lot of research.

And if "prevention" becomes the new key to the Treasury, which seems likely, we can look forward to a lot of reshuffling of NIH's granting priorities. —DSG

NAS Study Supports Clean Air Standards

Although the National Academy of Sciences' massive study of the health effects of air pollution drew some Senatorial sniping when it was unveiled last week, it is generally believed that the report will provide plenty of ammunition against industrial attempts to weaken the Clean Air Act.

The study, commissioned last year by the Senate Public Works Committee, concluded that although there's little data to go on, there's "no substantial basis" for changing air-quality standards designed to protect public health, which were established under the Clean Air Act. The NAS committee went on to suggest that in general the standards are supported by evidence which has accumulated since they were set three years ago.

Those findings will be increasingly cited during the next year or so, since the Clean Air Act is almost certain to come under attack by industry, led by automobile manufacturers, because of the stringency of the air quality standards and the costs incurred in meeting them. Next year, for example, the Clean Air Act is due to undergo a thorough review by Congress.

According to some key Senate aides surveyed by SGR last week, the NAS report is likely to persuade Congress to hold fast on the standards, and it's going to be difficult for opponents of the standards to make a strong case against them.

According to one estimate provided in the report, automobile emissions alone may account for as many as 4,000 deaths and four million so-called illness-restricted days each year. That's about one eighth of the number of deaths due to bronchitis, emphysema, and asthma, and about one tenth of the number of days lost from work because of respiratory illness.

However, the report notes that there's a scarcity of good data on the health effects of long-term exposure to a mixture of atmospheric pollutants, and it suggests that such studies should be undertaken.

As for the adequacy of the air quality standards, the NAS report says that there should be little trouble in meeting present standards for carbon monoxide by 1990, but in Los Angeles and other smog ridden areas, existing hydrocarbon emission standards may even have to be strengthened if the air quality standards are to be met.

On the adequacy of standards governing oxides of nitrogen, which have been under particularly strong attack from the automobile industry, the Academy says that although it is possible that the automobile emission standards may be more stringent than required to meet the air quality standards, there is a great deal of uncertainty about how oxides of nitrogen react with hydrocarbons to form smog. The report therefore cautions against relaxing the emissions standards until further study is completed.

The clincher in the report, however, is a cost-benefit study of cleaning up automobile pollution which comes

out on the benefit side of the equation, even with some conservative assumptions about the scale of the benefits.

In short, the study reckons that achieving automobile pollution standards will result in between \$2.5 and \$10 billion worth of benefits a year. Initially, it could cost about \$12 billion to meet the standards, but that figure is expected to decline sharply as the technology is improved.

"Weighing all of these estimates and their uncertainties, we conclude that the benefits that could reasonably be expected to accrue from implementing the Federal statutory emission control standards for automobiles are commensurate with the expected costs," the report states.

With the costs and benefits nearly in balance and with an estimate that automobile emissions now kill about 4,000 people a year, it is going to be difficult for the industry to argue that the standards should be relaxed.

The report did, however, get some criticism from Senator Jennings Randolph (D-W. Va.), the chairman of the Public Works Committee, who thought that the Academy should have devoted more time to examining pollution from stationary sources, particularly from the burning of coal. Since he comes from a coal state, his interest in the matter is readily explained.

(Summary copies of the report, *Air Quality and Automobile Emissions Control*, can be obtained from the Senate Committee on Public Works, Dirksen Office Building, Washington, D.C.)

M.D.s' Pay Rise Documented

A mass of statistics confirming the general impression of affluence among physicians has been compiled by the Congressional Research Service (CRS) of the Library of Congress under the title of "Facts About Physicians' Fees and Incomes." But if you want to get a copy, it is necessary to take the roundabout route of requesting one through a member of Congress, since CRS reports are not generally available to the public.

Prepared by the CRS in anticipation of physicians' remuneration being a key item in the next round of debate over national health insurance, the report shows, for example, that between 1965 and 1972, the median income of office-based physicians rose from \$32,000 to \$42,700; in the same period, the figures for several other professions were as follows: chemists, \$13,068 to \$18,581; engineers, \$13,272 to \$18,268, and attorneys, \$13,644 to \$23,448. The incomes cited for physicians are net amounts, after office expenses.

According to the report, the increase in physicians' incomes was unaccompanied by any significant change in patient visits per week. In fact, in general practice and pediatrics, there was actually a slight decline in visits.

Basic Research to Absorb NSF Budget Cuts

Congress has slashed some \$20 million from the budget of the National Science Foundation and arranged that virtually all of it will be taken out of NSF's support of basic research.

The cuts follow the general pattern of looking for budgetary items whose loss will cause the least voter backlash. Thus, the FY 1975 appropriations bill for NSF, which cleared Congress late last month, follows the pattern of increasing the Administration's budget request for the various educational-support programs which are particular favorites of college administrators and cutting back almost everything else.

In short, the appropriations committees lopped \$20.05 million off the overall budget request for NSF but at the same time added a total of \$6.8 million to graduate support, institutional improvement and science education programs, and decreed that none of the money allocated to those programs can be spent on anything else. The upshot is that all the other NSF programs must be trimmed by a total of \$20.8 million.

The appropriations bill itself reduces the program of Research Applied to National Needs by \$5.5 million and

knocks \$1.4 million from the budget for program development and management, but it leaves NSF officials free to decide where the other \$20 million will come from. According to one NSF official, however, as much as \$18 million of it will have to be taken from the support of individual research projects since other parts of the NSF's budget are difficult to cut.

In addition, the report of the Senate Appropriations Committee specifically states that no money should be provided for the Research Management Improvement program, a loudly proclaimed Administration initiative aimed at improving the management of scientific research at the institutional level, and it also specifies that NSF's social science programs should be held at last year's budget level.

The latter provision can be attributed to Senator William Proxmire (D-Wisc.), chairman of the Senate Appropriations subcommittee which deals with NSF's budget, who earlier this year signalled his displeasure at the Foundation's social research support by the time-honored Congressional tactic of ridiculing a few projects which have funny-sounding names.

Industry Favoritism Allegations Convulse FDA

Pure and unadulterated chaos has broken out at the Food and Drug Administration (FDA) following Congressional testimony by ten staff members, an ex-employee and three consultants to the effect that the agency still resides in the pocket of the drug industry.

The 14 witnesses, appearing under subpoena at a hearing chaired by Senator Edward M. Kennedy (D-Mass.), all told the same story, namely: that when they rendered decisions favorable to companies applying for approval of new drugs, their superiors accepted their work without quibble; when they flagged the applications for one alleged deficiency or another, their superiors often overruled them, issued reprimands, and, in some instances, abruptly transferred them to duties unrelated to their professional background.

FDA Commissioner Alexander M. Schmidt responded to the charges with assurances that he would conduct a thorough investigation. Subsequently, HEW Secretary Caspar W. Weinberger announced that the allegations would be publicly aired by a panel consisting of three government employees and three outside experts presided over by Theodore H. Cooper, deputy assistant to Assistant Secretary for Health Charles C. Edwards. Cooper, former director of the National Heart Institute, told SGR that he expects to line up the panel members

in time to start the inquiry around the end of September. He said that he intends to acquire from FDA all relevant records and do everything necessary to get to the bottom of the charges.

Meanwhile, back at FDA, some of the staff members who testified at the Kennedy hearings are privately charging that Commissioner Schmidt has embarked on a campaign of harassment against them. They base their charge on letters that all arrived from Schmidt on September 9, requesting that by September 16 they furnish him with comprehensive documentation concerning their allegations of preferential treatment for the pharmaceutical firms and their allegations of harassment within the agency. He said he would extend the deadline, if necessary, but made it clear that he wants the material in hand before September 25, which is when Kennedy will resume hearings on the subject.

Cooper's assurances of an impartial investigation are received with considerable skepticism by some of the FDA staff members involved in the controversy. They point out that Cooper works for Edwards, who preceded Schmidt as head of FDA. Why, they ask, wasn't the investigation assigned to an organization unattached to HEW, such as the National Academy of Sciences? Good question.

NIE Chief Quits Following Slash in Appropriation

The National Institute of Education (NIE), which was established two years ago to do something about the enduring infancy of educational research, is in a state of shambles, following repeated budgetary rebuffs by Congress and, just recently, the resignation of its founding director, Thomas-K. Glennan Jr.

Specifically created to wrest educational research from the arid bureaucracy of the Office of Education, NIE was a favored offspring of the Nixon Administration because it offered the option of relatively cheap research as an argument against plunging into expensive educational programs. However, when Glennan and his subordinates came before Congress to describe their plans, even some of the most friendly supporters of the new agency found themselves disappointed by what they considered to be inadequate preparation for Congressional quizzing and lack of any substantial departure from what had been traditionally dished up.

Glennan, a Ph.D. economist formerly with the Rand Corp. and Office of Economic Opportunity, was initially burdened in his Congressional relations by the White House's long delays in appointing the Council on Educational Research, from which he was supposed to take his policy guidance. In addition, since NIE distributed research money on a project basis, rather than

using the beloved pork-barrel technique of geographic earmarking, it failed to muster the support of national and regional education organizations. Finally, the education supporters in Congress looked with suspicion upon the Nixon Administration's efforts to boost educational research while money for education programs was being slashed and impounded.

Last year, all of these factors led Congress to cut sharply into the Administration's budget request for NIE. And this year, though it is generally agreed that Glennan was making progress in getting the organization on its feet, the residue of ill feeling remained so strong that the House cut Nixon's request of \$130 million down to \$80 million, and the Senate cut the figure down to \$65 million.

These slashes came at a time when one of the most respected and toughminded figures on the federal advisory scene, Pat Haggerty, of Texas Instruments, who chairs the Council on Educational Research, was passing the word that Glennan had at last taken command and NIE was beginning to carry out its mandate.

Glennan, whose resignation is effective October 15, cited family reasons for his departure, but it is understood that he felt that his presence had become a liability in NIE's relations with Congress. His successor, who is yet to be selected, will have to be appointed by the President and confirmed by the Senate.

Ban on Religious Applicants Sinks U.K. Research Fund

There's probably no concept more stoutly defended by the scientific community than the idea that funds for basic science should be distributed according to the scientific merit of applications and not according to any arbitrary criteria, which probably explains why a number of British scientists were recently thrown into a fit of apoplexy when a wealthy businessman, intending to put up some funds for biomedical research, announced that he wouldn't consider any applicant holding religious beliefs.

The businessman, Ray Turner, had the notion of donating some of his considerable wealth to a foundation to support bright young scientists conducting "independent fundamental research into outstanding questions relating to the chemical organization of life." Since he was offering five-year renewable grants at levels considerably higher than scientists could hope to get from universities, he had little trouble in attracting applicants.

Thirty-six applicants were invited to meet with Turner early this summer to discuss their proposals, during the

course of which Turner suddenly asked whether any of the applicants held any religious beliefs or believed in a "supernatural plan."

Since that's not a question scientists are usually asked when they apply for research support, a number of them were perplexed; Turner eventually explained that since he believes that there's a basic conflict between religious beliefs and basic biological research, he wouldn't support any religious scientists.

Whereupon a few candidates left. D. Bellamy, a Cardiff biologist who was serving as scientific coordinator of the Turner awards, said he didn't agree with the selection criteria, and a number of the applicants told Turner that funding for scientific research should only be based on scientific criteria.

Turner subsequently announced that he has abandoned his plans to support biological research.

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Mining Companies Scramble For Seabed Rights

With Howard Hughes out in the Pacific scooping manganese nodules off the ocean floor and the Law of the Sea Conference deadlocked over the question of how seabed mining should be regulated, American mining companies and their Congressional allies are pushing ahead with legislation designed to protect their investments in deep-sea mining technology.

If the legislation is passed by Congress this session, it could seriously undermine the US negotiating position when the Law of the Sea Conference reconvenes in Geneva next year, but at present, the bill's prospects are far from certain.

Originally written by the American Mining Congress, the industry's trade association, the bill, S-1134, was passed late last month by the Senate Interior Committee. Its prime sponsor, Senator Lee Metcalf (D-Mont.) was hoping to get a Senate vote on it by mid-September, but last week the Senate Foreign Relations Committee claimed jurisdiction, the bill was taken off the Senate Calendar, and it could be stalled until Congress adjourns in mid-October.

Meanwhile, identical legislation has been passed by the House oceanography subcommittee and is awaiting consideration by the Committee on Merchant Marine and Fisheries. Staff there say a decision on whether to push ahead with the bill will probably be made by the Committee late this month.

The bill essentially sets up a licensing scheme, administered by the Secretary of Interior, which would enable American mining companies to conduct exploratory mining operations on the deep seabed on payment

of a nominal fee. No commercial operations would be allowed until 1976, however, and licensees would have to convince the Secretary of Interior that they are actively conducting research and development and not just holding blocks of the seafloor to prevent other companies from getting at the manganese nodules.

On payment of a mere \$50,000, mining companies could get an exclusive license to conduct exploratory mining over an area of the seabed almost twice the size of Massachusetts. Furthermore, the federal government would reimburse mining companies for any investment losses they may incur if the Law of the Sea Conference comes up with an international agreement on seabed mining which adversely affects them, and the government would also provide insurance against damages caused by "any other person against whom a legal remedy does not exist."

Apart from the huge amounts of taxpayers' money which could be used to underwrite risks to the mining industry — a concept which has a precedent in the Price-Anderson nuclear indemnity act — opponents of the bill are anxious about its effects on the Law of the Sea negotiations.

Although the bill would obviously be superseded by any international treaty, State Department officials are concerned that if Congress passes it now, the move would be interpreted by other participants in the negotiations as a unilateral US act to establish claims on seabed riches. One effect could be to strengthen the hand of other countries which are arguing to extend their national boundaries.

NEWS NOTES: Heart, DoT, Math

More promises than money has generally characterized the Nixon-launched war on heart-related diseases under the National Heart, Blood Vessel, Lung, and Blood Act of 1972. But at last some major new grants are coming out of the National Heart and Lung Institute (NHLI), under a provision of the Act which authorizes the establishment of up to 30 National Research and Demonstration Centers.

So far, three of these have been established, with the latest being at the University of Vermont Medical College, which has been awarded \$900,000 for a program that will concentrate on lung diseases.

Earlier awards were to the King County (Seattle) Blood Bank, which received \$500,000, and the Baylor College of Medicine, which was awarded \$2.5 million for heart and vascular research and treatment. The amounts awarded are the first annual installment toward guaranteed support for five years.

The Department of Transportation's Federal Highway Administration plans to award 75 \$5000 fellowships and 40 \$2500 scholarships for fulltime study in the field of highway transportation next year — about the same number it is supporting in the current academic year. The deadline for applying is December 31. Applications may be obtained from the National Highway Institute, HHI-6, Federal Highway Administration, US Department of Transportation, Washington, D.C. 20590.

Edith H. Luchins, professor of mathematics, Rensselaer Polytechnic Institute, Troy, N.Y., has been awarded \$17,700 by the National Science Foundation for a 15-month study of methods to encourage more women to prepare for careers in mathematics. Luchins, who started the study this summer, told SGR one object will be to determine why the proportion of women in mathematics has sharply declined over the past half century.

Hail of Criticism for Weather Modification

Although the Pentagon has given weather modification a bad name by conducting a massive cloud seeding program during the Vietnam war which turned out to be a dismal failure, there's still a considerable body of opinion which maintains that not enough support is being given to weather modification research, and that the few programs which do exist are badly coordinated and seriously underfunded.

The latest such allegations have come from the General Accounting Office (GAO), which argues the case for a national weather modification research program to be established and managed by a single federal agency. Such suggestions are far from new — they have been made in nine separate reports in as many years — but they have usually come from committees of atmospheric scientists whose impartiality is open to question. GAO, however, has no axe of its own to grind, and its report is therefore worth noting.

Overall, GAO reckons that the federal government spent \$17.4 million on weather modification research in FY 1974 (the amount usually varies widely according to the definition of what actually constitutes weather modification), and seven agencies including DoD had a finger in the pie.

But GAO says that "to date...an effective overall national weather modification program has not been established," and although an Interdepartmental Committee on Atmospheric Sciences (ICAS) was established in 1959 as part of the Federal Council for Science and Technology, it "has had little or no impact in increasing coordination and accelerating progress in weather modification research and there has been little change in the way projects have been carried out."

Most large research projects are carried out by several agencies which are supposed to work together, but GAO turned up a number of instances in which participating agencies failed to contribute their full share to the effort either because they weren't sufficiently interested or because they lacked the funds, or both.

As a case in point, GAO took a look at the National Hail Research Experiment, a 5-year hail-suppression program begun in 1972, for which the National Science Foundation is the lead agency. The Departments of Agriculture, Commerce, Transportation, Defense and the Atomic Energy Commission all have a stake in the experiment, but GAO found that even though the operation is well planned, "for the most part, agencies could not, and did not meet all their obligations."

Agriculture, which was supposed to assess crop damage from hail and evaluate the economic effects of hail suppression in the experiment, informed NSF that it lacked funds to do the economic analysis. And the Forest Service had to decline an offer to take part in lightning studies connected with hail storms, because it lacked the resources.

The National Oceanic and Atmospheric Administration was supposed to provide three aircraft, two radars and survey teams to maintain ground network stations. But during the first year of the experiment, it provided only one aircraft, no radars and limited network maintenance. (Radars were supplied in the second year, but no aircraft were available.)

The Army had agreed to provide two helicopters, but none was furnished during the first fiscal year of the experiment. The Army and the Air Force were also supposed to provide personnel and equipment to man two radiosonde stations, but "because of a severe reduction in personnel, the Army was unable to support the 1972 operation."

Nevertheless, NSF Director H. Guyford Stever told GAO in a letter that the experiment has achieved excellent progress, and that the impediments noted in the report were minor. To which GAO replied that "each operational season has had, and probably will continue to have, problems with commitments from participating agencies unless organizational structure is changed."

All of that may or may not add up to a good case for a national weather modification research program managed by a single agency. Most of the agencies which commented on the report agreed that there are problems in coordinating weather modification, but they suggested that the Administration's proposal to establish a Department of Energy and Natural Resources would do the trick.

Since Congress hasn't shown much interest in that proposal, and since it has now been almost 10 years since the first recommendation was made for a national weather modification research program, swift action shouldn't be anticipated.

The report, *Need for a National Weather Modification Research Program*, No. B-133202, is available for \$1 from the GAO, Washington, D.C. 20546.

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DoD Still Getting Half of All US R&D Funds

NSF has produced its annual statistical portrait of the federal role in research and development, and it turns out that despite widespread impressions to the contrary, military programs are still hanging in there as the consumer of more than half of all spending for R&D.

They are budgeted for 52.1 percent of the \$19.6 billion that will be obligated in the current fiscal year, as compared with 53.4 percent in 1969. And of the growth in total R&D spending for the year—\$1.8 billion—national defense activities will absorb a bit over \$1 billion, with a large measure of the increase going into the Trident submarine ballistic missile system, the air-launched Minuteman missile, and other high-technology components of Defense Secretary Schlesinger's ambiguous but expensive counterforce strategy.

Meanwhile, it should be noted that all of 3.6 percent

of total R&D funds have been budgeted for the following: education, income security and social services, area and community development and housing, economic growth and productivity, crime prevention and control, and international cooperation and development.

Energy-related research has been coming up fast from the 2.1 percent that it occupied in 1969, but in the present year, it will still amount to only 5.1 percent of federal R&D spending.

These figures and the following table are contained in NSF 74-310, available without charge from NSF, Division of Science Resources Studies, 1800 G St. N.W., Washington, D.C. 20550. The document, four pages, summarizes a more detailed study to be published later this year, *An Analysis of Federal R&D Spending by Function, Fiscal Years 1969-1975.*

Federal R&D obligations by function: fiscal years 1969-75
(Dollars in millions)

Function	1969	1970	1971	1972	1973	1974 (est)	1975 (est)
Total	\$15,641.1	\$15,340.3	\$15,564.2	\$16,511.9	\$16,821.2	\$17,743.2	\$19,597.1
National defense	8,353.7	7,976.3	8,106.1	8,897.7	8,997.9	9,180.4	10,216.7
Space	3,731.7	3,509.9	2,893.0	2,714.3	2,601.3	2,509.9	2,544.6
Health	1,111.0	1,110.7	1,319.2	1,563.6	1,592.4	2,084.7	1,966.2
Energy development and conversion	327.9	317.3	323.6	383.2	442.1	574.2	998.8
Environment	321.4	358.5	475.0	546.7	678.2	737.5	980.2
Science and technology base	517.5	529.2	531.3	605.9	609.5	647.5	761.4
Natural resources	411.6	462.0	553.4	625.3	617.6	632.5	741.2
Transportation and communications	460.6	592.9	781.5	617.3	625.4	688.7	707.4
Education	158.4	151.4	198.4	208.0	230.9	227.4	210.1
Income security and social services	93.1	101.6	122.6	115.1	150.6	130.7	130.9
Area and community development and housing	49.2	90.9	108.3	102.1	117.2	126.5	130.5
Economic growth and productivity	73.4	98.9	109.0	78.2	90.4	117.1	112.5
Crime prevention and control	4.8	8.6	10.3	25.0	34.8	52.1	55.1
International cooperation and development ..	26.8	32.2	32.3	29.5	32.9	34.0	41.4

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